INF5620 Exam, Problem 1

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Numerical artifacts in time integration schemes

a) Exponential decay ODE:

$$T' = -kT, \ T(0) = T_0 \tag{1}$$

Numerical problems (artifacts and non-physical features) can arise from solving this ODE with numerical schemes (FE, BE, CN)

FE, TBA

BE, TBA

CN, TBA

b) Diffusion problem PDE:

$$T_t = kT_{xx} \tag{2}$$

Numerical problems (artifacts and non-physical features) can arise from solving this PDE with numerical schemes (FE, BE, CN)

FE, TBA

BE, TBA

CN, TBA